

Csci 688 (Kincaid/MWF 9-9:50 a.m. Jones Hall)

Scale-Free Networks

Homework 5: Due Monday, October 5, 2009

1. Calculate the shortest path distance matrix using the Floyd-Warshall algorithm for the 1990 air transport network. The Floyd-Warshall code and 1990 air transport network are available on the math network in `~rrkinc/homework/` and on my homepage <http://www.math.wm.edu/~rrkinc/index.html>. The files you'll need are `floyd.c`, `1990_259.txt`, and `1990_318.txt`. In addition `floyd.c` is setup to compute the shortest path distance matrix (and predecessor matrix) for the file `edges32.dat`. You may want to copy this file to test out the code. The raw data for 1990 is also available, `T-100_Domestic_1990.zip`.
2. Determine the average shortest path length and the maximum shortest path length for your network in Problem 1. (Note that "distance" will be the number of flight legs.)
3. Construct the complementary cumulative degree distribution. Plot it three ways: normal, semi-log, and log-log. Does the tail "look" as if it follows a power law? Why or why not?

Please work in groups of no more than 3 and no less than 2 humans. You may include as many non-humans as you like.